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IS 10560 (1983): Jotter ball pen refills [CHD 14: Printing, Inks, Stationary and Allied Products]



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*Indian Standard*  
**SPECIFICATION FOR**  
**JOTTER BALL PEN REFILLS**

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**BUREAU OF INDIAN STANDARDS**  
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# *Indian Standard*

## SPECIFICATION FOR JOTTER BALL PEN REFILLS

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# *Indian Standard*

## SPECIFICATION FOR JOTTER BALL PEN REFILLS

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 28 April 1983, after the draft finalized by the Pens Sectional Committee had been approved by the Consumer Products and Medical Instruments Division Council.

**0.2** This standard covers the requirements of essential materials, dimensions necessary for interchangeability and functional tests to ensure good writing quality and reasonable life.

**0.3** IS : 10559-1983\* is a necessary adjunct to this standard.

**0.4** This standard contains clauses which call for agreement between the purchaser and the supplier and which permit the purchaser to use his option for selection to suit his requirements. The relevant clauses are 3.1 and 6.1.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value shall be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard covers the requirements of jotter ball pen refills made entirely from metal.

### 2. MATERIALS

**2.1** Tube ( ink container ) shall be made of brass or nickel-copper alloy or stainless steel.

**2.1.1** When made of brass, tube ( ink container ) shall be electroplated.

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\*Specification for jotter ball point pens.

†Rules for rounding off numerical values ( revised ).

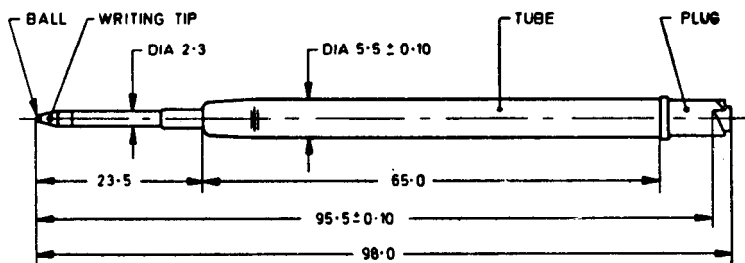
**2.2** Writing tip shall be made from solid brass rod or nickel-copper alloy or stainless steel or any other non-corrosive material having same hardness characteristic or higher than that of brass.

**2.3** Ball shall be made of stainless steel or tungsten carbide having hardness between 650 to 750 *HV*.

**2.4** Back-plug shall be made of suitable plastics having sufficient resistance to mechanical abrasion.

### 3. DIMENSIONS

**3.1** Refills shall be made according to shape and dimensions as given in Fig. 1. The illustration is diagrammatic only and is not intended to give details of design. The ball shall be of 0.7 to 1.20 mm diameter as agreed to between the purchaser and the supplier.



All dimensions in millimetres.

FIG. 1 REFILL, JOTTER BALL PEN

### 4. REQUIREMENTS

**4.1** The refills shall be so made as to be perfect in shape as shown in Fig. 1. They shall be straight and concentric with its ball.

**4.2** The tube (ink container) shall be filled with ink conforming to IS: 5805-1970\*. Colour of the ink shall normally be black, blue, green, orange or red. The writing end of the tube is plugged with a ball-point tip and the other end with the back-plug. The ink shall not overflow the barrel or leak around the ball. The refill during disuse shall not ooze ink when held with ball point tip upward and downward and shall not result in smudginess or discontinuity in writing. The refill shall have sufficient ink-capacity so that it shall be able to write continuous line of 4 000 m minimum for refill having ball dia 0.70 mm and 0.80 mm and 3 500 m for refill having ball dia above 0.80 mm when tested for length of writing as specified in 5.3.

\*Specification for ball point pen ink.



**4.3** Sufficient quantity of silicon grease of suitable quality shall be applied at the top layer of the ink reservoir before the other end of the refill is sealed with the plug.

**4.4** The tip, holding the ball, shall be worked over so that its edges shall be smooth and free from any feathers, fine, etc, that would scratch the paper while writing.

**4.5** The colour of the back plug shall indicate the colour of the ink contained in the refill. The back plug shall plug the back end of refill properly and shall also be in perfect match with the actuating mechanism.

## 5. TESTS

**5.1 Starting Test** — The refill shall be made to draw a few lines or letters on a sheet of paper to ensure continuous writing. The refill shall then be kept in the vertical position with the writing tip up for 30 minutes. The refill shall now be tested on a white super calendered printing paper or cream laid or cream wove paper conforming to IS : 1848-1971\* by drawing a few lines, starting exactly from the margin, with normal writing pressure. The refill shall start marking the first line from a distance of not more than 15 mm and the subsequent lines shall start immediately from the margin where they are drawn.

**5.2 Continuity Test** — The refill shall be tested on a sheet of white super calendered printing paper or cream laid or cream wove paper conforming to IS : 1848-1971\* by writing numerous fast as well as slow letters, flourishes, ovals, reversals, angles, etc. The writing shall be such that it has complete continuity without excess deposit of ink or variation in intensity or line getting split up.

**5.2.1** After 48 hours examine the sheet, the refill shall be considered to have satisfied the requirements of the test if there is no feathering or spreading or penetration to the reverse side of the paper.

**5.3 Length of Writing** — An unused pen shall be used for this test. A drum covered with white super calendered printing paper or cream laid or cream wove paper conforming to IS : 1848-1971\* shall be rotated so that its peripheral speed is 150 mm/s and the writing tip of the pen shall be made to touch the paper with a uniform normal writing pressure of  $110 \pm 5$  g perpendicular to the point of contact. The pen shall have a slow movement parallel to the axis of the drum so that the lines drawn on the paper are continuous but not overlapping. Continuity of writing shall be judged by visual observation and interruption of continuity due to any necessary

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\*Specification for writing and printing papers (first revision).

adjustment in the mechanism or change of paper rolls shall be neglected. The pen shall be able to draw a continuous line of minimum length as specified in 4.2.

**5.4 Smearing Test** — After writing a few lines or letters on a sheet of white super calendered printing paper or cream laid or cream wove paper conforming to IS: 1848-1971\* and waiting for 5 seconds, the writing shall be rubbed lightly with hand. The ink shall have been dried so that the writing could not be smeared.

**5.5 Hardness Test** — A sheet of paper shall be placed on a platform scale. The sample pen, with the refill propelled shall be held between 3.2 mm and 3.8 mm from the writing end at an angle of 50° from the horizontal without the hand touching the paper. The force of 9 kg shall be applied gradually and uniformly within a period of approximately 5 seconds and immediately released. The tip shall then be examined under microscope and there shall not be any major deformation on the tip.

**5.6 Corrosion Resistance Test** — The metal parts of the refill shall be dipped in a boiling 10 percent (w/w) aqueous solution of sodium chloride for 15 minutes. After removal from this solution they shall be immersed in 10 percent (w/w) aqueous solution of sodium chloride at room temperature for 2 hours. They shall then be removed, washed with clean water, wiped with a soft cloth and allowed to dry for 24 hours at room temperature. The metal parts shall not show any visible signs of corrosion.

**5.7 Accelerated Ageing Test** — The refills shall be suspended point down and subjected successively to each of the following conditions:

<i>Exposure</i>	<i>Time (hours)</i>	<i>Temp (°C)</i>	<i>Relative Humidity (Percentage)</i>
I	168	$60 \pm 1^{\circ}\text{C}$	85-90
II	48	$-2^{\circ}\text{C}$	

At the end of the test the refill shall satisfy the continuity test given in 5.2 and the ink shall not have leaked nor its colour changed during or after the test.

**5.8 Storage Test** — The refills shall be kept under normal storage for not less than six months from the time of manufacture. After this period they shall not have lost their writing characteristic and shall again satisfy the requirements of starting test ( 5.1 ) and continuity test ( 5.2 ).

## 6. SAMPLING

**6.1 Sampling procedure and acceptance criteria for jotter ball pen refills** shall be as agreed to between the purchaser and the supplier. A recommended scheme for the same is given in Appendix A.

\*Specification for writing and printing papers ( *first revision* ).

## 7. MARKING AND PACKING

**7.1** The refills shall be marked with manufacturer's name or registered trade-mark and batch number or date of manufacture.

**7.2** The refill may also be marked with Standard Mark.

**7.2.1** The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

**7.3** Each refill shall be packed in a pilfer proof pack attached to a carton giving the following details:

- 1) Manufacturer's name or registered trade-mark,
- 2) Month and year of manufacture,
- 3) Batch number, and
- 4) Colour of the ink.

**7.4** One dozen of such pilfer-proof packs each containing one refill shall again be packed in a paper carton.

## APPENDIX A

( Clause 6.1 )

### SAMPLING SCHEME AND CRITERIA FOR CONFORMITY FOR JOTTER BALL PEN REFILLS

#### A-1. LOT

**A-1.1** In any consignment, all the jotter ball pen refills manufactured under similar conditions, from the same raw material, shall be grouped together to constitute a lot.

#### A-2. SAMPLING

**A-2.1** The number of refills to be selected at random from a lot shall depend upon the size of the lot and shall be in accordance with col 1 and 2 of Table 1.

**TABLE 1 SAMPLE SIZE AND CRITERIA FOR CONFORMITY**

Lot Size	( Clause A-2.1 ) FOR TEST FOR DIMENSION ( 3.1 ) AND FOR REQUIREMENTS ( 4.1 TO 4.4 )		FOR TESTS IN 5.1 TO 5.4	
	Sample Size	Acceptance Number	Sub-sample Size	Acceptance Number
(1)	(2)	(3)	(4)	(5)
Up to 150	20	1	5	0
151 to 300	32	2	8	0
301 to 500	50	3	10	0
501 to 1 000	80	5	13	0
1 001 to 3 000	125	7	15	1
3 001 to 10 000	200	10	20	1
10 001 and above	315	14	30	2

**A-2.2** The refills in the sample shall be selected at random from the lot and in order to ensure the randomness of selection, IS : 4905-1968\* may be used.

### **A-3. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY**

**A-3.1** The refills selected according to **A-2.1** and **A-2.2** shall be inspected for dimensions ( 3.1 ) and requirements ( 4.1 to 4.5 ). The refill failing in any one or more of the requirements shall be considered as defective. The lot shall be considered as conforming to the requirements of the characteristics mentioned above, if the number of defective refills in the sample does not exceed the number given in col 3 of Table 1.

**A-3.2** The lot having been found conforming to **A-3.1**, shall be tested for starting test ( 5.1 ), continuity test ( 5.2 ), length of writing ( 5.3 ), smearing test ( 5.4 ). For this purpose, a sub-sample of size given in col 4 of Table 1 shall be taken from the refills selected as in **A-2.1** and **A-2.2**. Each of the refills in the sub-sample shall be subjected to the tests mentioned above. A refill failing in any one or more of the tests shall be considered as defective. The lot shall be considered as conforming to the requirements of the tests if the number of defectives in the sub-samples does not exceed the number given in col 5 of Table 1.

**A-3.3** The lot having been found conforming to **A-3.2**, a sample of jotter refill shall be tested for hardness test ( 5.5 ), corrosion resistance test ( 5.6 ) and accelerated ageing test ( 5.7 ). A refill failing in any one of the tests shall be considered as defective. The lot shall be considered as conforming to the requirements of the tests if the sample passes both the tests.

**A-3.4** The lot shall be accepted if **A-3.1**, **A-3.2** and **A-3.3** are satisfied, otherwise rejected.

\*Methods for random sampling.

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